The Impact of problem-solving based learning education on the self-efficacy of nursing students

Masumeh Hemmati Maslakpak[1], Samira Orujlu[2*]

[1]Assistant professor, PhD of nursing, Urmia University of Medical Sciences, Urmia, I.R. Iran
[*2]MSc of nursing, Urmia University of Medical Sciences, Urmia, I.R. Iran
*Corresponding author: samira_orojlo@yahoo.com; Tel and Fax: 0441-2754961

Abstract: Self-efficacy in applying scientific and professional knowledge and skills is important. One of the proposed ways to create such traits in students is teaching them with active and problem-oriented learning techniques such as problem-solving based learning. The aim of this study was to determine the effect of problem-based learning education in nursing students' self-efficacy. **Methods**: This quasi-experimental study is included 80 fourth-year nursing students. 40 students was selected in the intervention and control groups equally. In the both of groups completed General Self-Efficacy-Schwarzer (GSES) questionnaire before education and a month after the education. Students in the intervention group attended in the five small groups in problem solving education classes for six sessions. Data analysis was done by SPSS software, t-independent and paired t-tests, chi-square. **Results**: The results of this study showed that mean score of students self-efficacy before and after problem solving education in the intervention group, have significant difference. T- independent test showed a logical statistical difference between mean score difference in the self-efficacy scores between the two groups, after intervention (p=0.002). **Conclusions**: Problem-solving based learning education program improve students self-efficacy. Thus, it is recommended to pay more attention to this educational method in higher education curriculum.

Key-words: Problem-solving based learning, Self-Efficacy, Nursing student

Introduction

It is the responsibility of the teachers to reveal the internal talents, creativity, and self-efficacy of nursing students in meeting the changing needs of the patients (1). Bandora noted that self-efficacy is a creative ability by which cognitive, social, emotional, and behavioral skills of man are organized effectively for achieving various goals. In his view, an individual's prior skill and achievements do not suffice for predicting his/her future performance, but it is the one's belief about his/her capabilities that will have an effect on his/her performance (2). Related self-efficacy beliefs influence every individual's goals and forms the consequences of man's behavior. When faced with problems, the people who have low self-efficacy convince themselves easily that their behavior is useless and stop striving soon. But, those who have high self-efficacy remove the obstacles by improving their self-management skills and perseverance and resist the problems (3). Self-efficacy factor is of utmost importance in educational environments, that implies the students' beliefs about their capability in performing the prescribed curricular paper works. The students who believe in their academic success have more confidence in their capabilities (2,4,5). Studies suggest that self-efficacy is involved in knowledge acquisition (6) and in the development

and improvement of skills (7). The results of Harvey and Mac Murray's study showed that the probability of getting less than satisfactory grades in nursing courses among students with low self-efficacy is more than that among student with high self-efficacy (8). Lent et al (2006), in a study on moderator variables related to education, found that high self-efficacy can contribute to the improvement of students' learning methods, and predict the process of progression (9). Studies conducted by Schwartz (2005) in 23 countries showed that there is a direct relationship between self-efficacy and academic achievement (10). Hence, it is crucial to evaluate the self-efficacy in educational systems (8).

In traditional education system, the students used to focus on memorizing concepts instead of understanding and applying them. These students would just contend themselves with uninformed care in clinical practice and would perform passives (11). The Problem-solving based learning is a new meta-cognitive strategy in educating which can improve the students' decision-making skill. This is the kind of student-centered learning method which focuses on confronting students with problems, and creates motivation and stimulation for learning in them. Problem-solving based learning is a pedagogical approach in which students learn how to learn and how to collaborate in groups that are looking for a

solution (12). In problem-solving based learning, learning occurs through encountering problems; although, there may be not always solution to these problems. But, in this way of learning, students are provided with a situation in which they will identify and think about the material that they should study (11). According to the importance of self-efficacy in improving the performance and individuals' educational achievements, the present study was conducted to find out the effect of training problem-solving based learning on self-efficacy of graduate students. This was done to consider the students' beliefs and abilities in teaching-learning process, and to identify the most appropriate teaching method for improving the professional capability of nursing students in terms of their self-efficacy.

Materials & Methods

        This is a quasi-experimental study in which the effect of training problem-solving based learning to nursing students on their self-efficacy has been examined. Subjects in this study were 80 graduate nursing students. Students in their 7th semester were selected as the intervention group (40 persons), and students in their 8th semester were selected as control group (40 persons). In the briefing of participation in research, these students expressed their satisfaction for participating in the study. The data collection tool was a two-part questionnaire; the first part of which was about students' demographic characteristics (age, gender, high school GPA [Grade Point Average], number of siblings), and the second part would contain the question of General Self-efficacy Questionnaire. This questionnaire contains 17 items which are graded, based on Likert's scale, from completely disagree (score 1) to strongly agree (score 5). Scoring is done from 1 to 5, so for the items 15, 13, 9, 8, 3, 1 a score from 1 to 5 is given from left to right. The rest of the questions, in reverse, are given the scores from 5 to 1 respectively. The maximum score is 85 and the minimum is 17. The internal consistency of the questionnaire tuned out to be 0.79 by Chronbach's alpha method (13). The reliability coefficient is obtained 0.79 in Bakhtiari (14), 0.85 in Abdinia (15), and 0.91 in Arabian (16).

        Both control and intervention groups, at first, answered the Sherer's Self-efficacy Questionnaire, then the intervention group of subjects was divided into 5 groups of 8. Then they participated in the intervention program in this study which was conducted in a group discussion way. Each training session lasted 2 hours. All sessions were held in one of the training classes of Imam Khomeini and Taleghani hospitals. According to the division of intervention group into 5 smaller groups and the number of the held sessions for each group (6

sessions), a total of 30 sessions were held. Steps were as follows: 1. Developed scenarios by the researcher were given to students and they were encouraged to clarify the obscure points. 2. The subject was expounded by the researcher. 3. The setting for brainstorming, group work, and group discussion was created. 4. Theorizing was done according to the content of the scenario, and the questions based on the nursing process was answered to achieve educational goals. 5. Individual and group study for collecting information from the introduced sources was done by students through library and internet. 6. The defined topics were provided based on assumptions, goals, and questions, and group discussion was conducted. 7. The researcher summarized the presented topics and evaluated them. One month after conducting the instruction of problem-solving based learning, both intervention and control groups answered the General Self-efficacy Questionnaire again. To evaluate the results, the data obtained from the under-study units were encoded and analyzed with SPSS software version 16 and with tests of descriptive statistics; Chi-square, t-independent and paired t-tests with a significance level of p= 0/5.

Results

        The results of this study showed that 40 percent of the control group and 36 percent of the intervention group was male. The chi - square test showed no significant difference between the two groups in terms of gender. The t- independent test revealed no significant difference between control group and intervention groups in terms of the age, students' GPA variables, high school GPA, the grade in Konkoor (university entrance) examination, and the number of siblings (p>0.05) (table1). The results of this study showed that, the mean score of students' self-efficacy before training problem-solving based learning had no significant difference in the two groups. The students' mean score in the intervention group had increased more in comparison with that in the control group, and this increase was statistically significant (p<0.001). T- independent test showed a logical statistical difference between mean score difference in the self-efficacy scores between the two groups, after intervention (p=0.002) (table2). The result of the Wilcoxon test showed that the mean score of self-efficacy had no significant increase in the control group after conducting the instruction of problem-solving based learning (p=0.13). In the intervention group, the mean score of self-efficacy had an increase after conducting the instruction of problem-solving based learning which was statistically significant (table 3).

Table 1.Comparison of demographic characteristics between the intervention and control groups

Variable	Intervention Group		Control Group		t-independent results
	Mean	Standard deviation	Mean	Standard deviation	
Age(year)	21.88	0.66	21.92	0.99	P=0.12
Students' GPA	16.44	0.90	16.21	1.06	P=0.42
High school GPA	17.53	1.31	17.64	0.90	P=0.73
Grade in Konkoor	6371.36	2555.69	6468	1675.24	P=0.87
Number of sisters	1.84	1.40	1.72	1.10	P=0.73
Number of brothers	1.56	1.04	1.44	1.003	P=0.68

Table 2.Comparison of self-efficacy mean scores between the intervention and control groups before and after the training problem-solving

Self-efficacy	Control Group	Intervention Group	t-independent results
	Mean± SD	Mean± SD	
Before of intervention	54.52±4.88	56.25±5.66	P=0.34
After of intervention	56.43±6.30	65.59±8.23	P<0.001
Difference after - before	1.91±6.68	9.33±7.18	P=0.002

Table 3. Comparison of self-efficacy mean scores the intervention and control groups before and after the training problem-solving

self-efficacy	Before of intervention	After of intervention	paired t-tests results
	Mean± SD	Mean± SD	
Control group	54.52±4.88	56.43±6.30	P=0.13
Intervention group	56.25±5.66	65.59±8.23	P<0.001

Discussion

In nursing career, only the ability to do your duties is not enough, but the ability in combining knowledge, observation, values and skills in presenting professional services is also important (17). The present study was conducted to find out the effect of training problem-solving based learning on students' self-efficacy. The results showed that students' self-efficacy increased significantly after training. A study was conducted by Sungar and Takkaya (2006) with the aim of comparing the effects of training problem-solving based learning and traditional training on students' self-regulating learning, The obtained results showed that students in the group trained problem-solving based learning compared to those in the control group, had a higher level of intrinsic orientation and peer learning (18). Also, the results of a study conducted by Scholz in 2002, showed that training problem-solving based learning has a variety of positive outcomes such as increased self-efficacy in students (19). Confirming the results of the present study, Seo (2005) also examined the effect of problem-solving based learning and lecture-based learning on mental and structural ability of the students; the results showed that problem-solving based learning group got higher scores in structural and mental abilities (20).

Moreover, Akinlogo and Tendalgen (2006) in a study aiming at examination of the effects of science instruction through problem-solving based learning in the educational achievement and concept learning of the students found that implementation of problem-solving based learning, significantly increased the students' conceptual achievement (21). But, in Herzig et al's (2003) study of learning problems, no significant difference is presented between long-term effects of problem-solving based learning and systematic lecturing in accordance with the rules and principles of a good lecture. In this regard, we can say that despite the many advantages of problem-solving based learning, we cannot ignore the value of a good lecture and a structured approach in transferring concepts to students (22).

The findings, also, showed a statistically significant difference in the mean scores of self-efficacy and logical differences between intervention and control groups after training problem-solving based learning. In this regard, the result of Eze (2003) and Govindasany et al (2010) showed that active learning strategy, considerably, improves students' achievement and enhance their self-efficacy beliefs since there is a strong correlation between success and self-efficacy (23,24). The increase in students' self-efficacy compared with the students in control group, implies that applying problem-solving based

learning is a way to enhance students' self-efficacy. In fact, positioned in this manner, the student is provided with an appropriate stimulus for group discussion, question-and-answer, individual and learner-centered studying, inquiry and discovery by using available sources, applying the learned knowledge, internal talent and creativity, and ultimately they can improve their skills in self-efficacy.

Conclusion

Verifying the capability of training problem-solving based learning in enhancing students' self-efficacy in this study, is a satisfying result which confirms the hypothesis of this study. Self-efficacy has an important role in creating an ability for taking care of the patient. Thus, the university professors play an important role in enhancing students' self-efficacy- the factor which predisposes the students to professional autonomy acquisition and improves their nursing competencies; this important matter is the outcome of choosing teaching-learning approach at universities.

Ethical approval

This study was approved by the Ethics Committee of Urmia University of Medical Sciences and written consent was obtained from all students.

Corresponding author address: Samira Orujlu, Nursing & Midwifery Faculty, Urmia University of Medical Sciences, km 11 of Seru road, Nazlu Campus, Urmia, Iran
Email: samira_orojlo@yahoo.com
Tel and Fax: 0441-2754961

References
1. Glen S, Wilkie K. Problem-based Learning in Nursing: A New Model for a New Context. New York: Macmillan. 2000, P.127-150.
2. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. Psychol Rev 1977; 84(2):191-215.
3. Bandura A. Health promotion by social cognitive means. Health Educ Behav 2004; 31(2): 143-164.
4. Bandura A. Regulative function of perceived self-efficacy. 1st ed. New Jersey: Lawrence Erlbaum Associates, 1994, P.261-271.
5. Bong M. Role of self-efficacy and task-value in predicting college students' course performance and future enrollment intentions. Contemporary Educational Psychology 2001; 26(4): 553-70.
6. Pajares F. Self-efficacy beliefs in academic setting. Rev Edu Res 1996; 66(4): 24-26.
7. Fereday J, Muir-Cochrane E. The role of performance feedback in the self-assessment of nursing competence: a research study with nursing clinicians. Collegian 2006; 13(1): 10-15.
8. Harvey V, McMurray N. Self-efficacy: a means of identifying problems in nursing education and career progress. International Journal of Nursing Studies 1994; 31(5): 471-85.
9. Lent RW, Schmidt J, Schmidt L. Collective efficacy beliefs in student work teams: Relation to self-efficacy, cohesion, and performance. J Vocational Behav 2006; 68(1): 73-84.
10. Schwarzer R, Luszczynsk A. Self efficacy adolescence risk taking behavior and health. In: Self-Efficacy Beliefs of Adolescents. Information age publishing 2005: 139-159
11. Bowers B, McCarthy D. Developing analytic thinking skills in early undergraduate education. J Nurs Educ 1993; 32(3):107-14.
12. Mete S, Yildirim Sari H. Nursing students' expectations from tutors in PBL and effects of tutors' behaviour on nursing students. Nurse Educ Today 2008; 28(4): 434-442.
13. Bakhtiari Barati S. Study of simple and multiple relationships of effective variables, self-esteem and self-discovery with academic performance of students in the third year of the new system in Ahwaz. MSc thesis, Psychology School of Shahid Chamran University of Ahvaz, 1997. [Persian]
14. Mohammadi A, Abedi A, Khanjani M. Improving the Self-Steem and Self-Efficacy among Juveniles. Journal of Iranian Psychologisis 2008; 15(4):245-252. [Persian]
15. Abdinia M. Relationship of self-efficacy, goal orientation, self-learning, academic achievement. MSc thesis, Faculty of Psychology and Educational Sciences of Tehran University, Tehran, 1998. [Persian]
16. Arabian A, Khodapanahi MK, Haydari M, Saleh Sedghpoor B. Relationship between self-efficacy

belief, mental health and academic achievement in colleagues. Journal of psychology; 32(4):360-371. [Persian]

17. Defloor T, Van Hecke A, Verhaeghe S, Gobert M, Darras E, Grypdonck M. The clinical nursing competences and their complexity in Belgian general hospitals. Adv Nurs J 2006; 56(6): 669-678.

18. Sungar S, Tekkaya C. Effects of problem based learning and traditional instruction on self-regulated learning. The Journal of Educational Research 2006; 99 (5): 307-330.

19. Scholz U, Gutiérrez Doña B, Sud S, Schwarzer R. Is General Self-Efficacy a Universal Construct? Psychometric Findings from 25 Countries. European Journal of Psychological Assessment 2002; 18(3): 242-251.

20. Siu HM, Laschinger HK, Vingilis E. The effect of problem-based learning on nursing students' perceptions of empowerment. J Nurs Educ 2005; 44(10):459-469.

21. Akinlogu, O, Tandaolgon O. Effects of problem based learning in science education on students' achievement and concepts learning. Eurasia Journal of Mathematics Science & Technology Education 2006; 3(1): 71- 81.

22. Herzig S, Linke RM, Marxen B, Börner U, Antepohl W. Long-term follow up of factual knowledge after a single, randomised problem-based learning course. BMC Med Educ 2003; 3(1): 3.

23. Eze UN. (2003). Effects of elaborative interrogative strategy on schooling adolescents' perceived self-efficacy and achievement in selected science concepts. The Educational Psychologists 2003; 1(1):62-74.

24. Govindasany M. K, Muniandy B, Jamaluddin R. Embodied agent's social presence in web-based learning environment: Effects on field dependent/independent lower achievers' self-efficacy beliefs and learning engagement. Malaysian Journal of Educational Technology 2010; 10 (2): 55-71.

6/28/2014